

Boetius and Bichcrou have utilized this method of firing in a furnace invented by them and bearing their names.

When many of the various existing types of furnaces, such as the continuous furnaces, Siemens furnaces, brick kilns, etc., are analyzed, it will be noted that their construction is such as to preclude, in reality, the draft action of the chimney in drawing in outside air and to limit the action of the chimney to the removal of the waste gases. The drawing in of the cold outside air would have an injurious effect upon the working of the furnace, particularly in the case of brick kilns. Those furnaces, therefore, constitute a perfect illustration of the fundamental principle of the method in which metallurgical furnaces operate. It is well known that the pressure of the hot gases in the heating chamber of such furnaces is practically equal to the pressure of the atmosphere. The gases coming from the firebox and the supply of secondary air, if such is necessary for the operation of the furnace, enter the heating chamber under a pressure head which may be measured by the difference in level between the grate bars and the hearth of the furnace. The chimney for a metallurgical furnace should be designed to provide for the removal from the heating chamber of the burned gases, but it should not, in addition, provide any further draft depression. On the contrary, it is always desirable that there should be a slight positive pressure<sup>1</sup> in the heating chamber of metallurgical furnaces.

(6) Hydrostatic Pressure within Metallurgical Furnaces and their Flues.—1. All reverberatory furnaces comprise a chamber of some fixed height filled with incandescent gases. At each point in the interior of this chamber there will be a different pressure, according to the height of the point. Therefore, in a reheating furnace, having working doors with a height of

700 mm, with a pressure equal to that of the atmosphere acting at the hearth level, there; will be a pressure +0 mm of water, at the level of the top of the door, as has been shown previously on page 13.

This pressure, in excess of that of the atmosphere, causes, as is well known, the formation of a great aureole or "sting" of flame due to the hot gases which escape through the crevices at the top of the door. In order to diminish the loss of gases through these crevices, the following means may be employed. By a slight increase in the chimney draft, the level at which the pressure in